

## Attitude and behavior of senior high school students toward environmental conservation

JULIE S. BERAME<sup>1\*</sup>, NONOTZSKA W. LUMABAN<sup>4</sup>, STEPHANY B. DELIMA<sup>1</sup>, RISSA L. MERCADO<sup>1</sup>,  
MINIE L. BULAY<sup>1</sup>, ANGELIKA B. MORANO<sup>2</sup>, CHRISTINE DEBBIE MAR G. PAROHINOG<sup>3</sup>

<sup>1</sup>College of Education, Caraga State University. Butuan City 8600, Philippines. Tel./fax.: +63-9199222449, \*email: Janveel@yahoo.com

<sup>2</sup>Santiago National High School. Santiago Agusan del Norte, Philippines

<sup>3</sup>San Isidro National High School. Trento, Agusan del Sur, Philippines

<sup>4</sup>Sangalan Integrated School. Sangalan, Gingoog City, Philippines

Manuscript received: 18 August 2022. Revision accepted: 12 October 2022.

**Abstract.** Berame JS, Lumaban NW, Delima SB, Mercado RL, Bulay ML, Morano AB, Parohinog CDMG. 2022. *The attitude and behavior of senior high school students toward environmental conservation. Biodiversitas 23: 5267-5277.* The worsening environmental problems have become a serious concern prompting humanity to search for solutions aiming for environmental management through understanding the relationship between human-environmental attitude and behavior with the belief that humans are the prime contributor to both - problem and the solution. By acknowledging this existing situation, this study was designed to assess the senior high school student's level of understanding of and attitude toward the environment and the effects of both variables on their ecological behavior. A sequential strategy under mixed-method research was used in the study. A survey questionnaire containing both qualitative and quantitative questions was distributed to and answered by the respondents, followed by a focus group discussion that solidified and substantiated the quantitative result. Analysis of the responses demonstrated that students' environmental attitudes were uncertain and connoted that they have intermediate attitudes and were all observed to be connected to their intermediate ecological behavior. Further, it revealed anthropocentric attitudes were dominant among students. This environmental attitude, together with human dominance over nature, denoted correlation along ecological behavior toward conservation policies, environmental threats and support for population growth policies, while eco-centric attitudes do not correlate to ecological behavior. In conclusion, the limited and ambiguous knowledge of senior high school students on the rule of human and nature need reinforcement for them to develop a good quality viewpoint about nature and willingly advocate environmental protection through their actions.

**Keywords:** Anthropocentric, eco-centric, ecological, environmental attitude, conservation, human dominance

### INTRODUCTION

Global warming, the greenhouse effect, ozone layer depletion, environmental degradation, nuclear pollution, reduction of green areas, and the extinction of some plant and animal species are some of the most important environmental problems of today (Maravić et al. 2014). As one of the fastest-growing countries in Asia, the Philippines also faces these environmental challenges, with disproportionate impacts on the poor and women (USAID 2022). The Philippines must become more environmentally resilient and better equipped to cope with the impact of natural disasters and recover rapidly if it is to become a more stable, prosperous, and well-governed nation.

Environmental awareness is an essential product of environmental education (Maravić et al. 2014). So, environmental education can result in direct benefits to the environment and address conservation issues concretely. Ardoin et al. (2020) reviewed 105 substantial types of research and provided robust positive data on environmental education's contributions to conservation and environmental quality outcomes. Barrett (2021) concluded that several environmental education programs achieve cognitive and affective outcomes by highlighting conservation outcomes which showed that focusing on

local issues, partnerships, and action is a key to achieving cognitive and affective conservation behavior outcomes.

Environmental education is believed to have a substantial impact on students' environmental awareness, daily routines, and consumer behavior (Walker 2017; Williams et al. 2017; Zsóka et al. 2013). Several studies have shown that education is a key factor in increasing environmental awareness (Freymeyer and Johnson 2010; Duroy 2005; Kolmuss and Agyeman 2002). Environmental awareness involves both the cognitive and affective domains of learning. Students should have sufficient knowledge of environmental issues and a good perception of one's impact on the environment. Deiarne and Hagos (2008) reported that integration of environmental education is necessary to produce students who are earth-friendly, committed to environmentally sound lifestyles and prepared to contribute to the environment. Zsóka et al. (2013) examined the relationship between environmental education and students' knowledge, attitudes and reported actual behavior for both university and high school students. Their findings demonstrated a significant relationship between the level of environmental education and students' environmental understanding. In order to move toward a sustainable future, it is important to create scientific information about the factors that motivate

students to act in an environmentally responsible manner (Shafiei and Maleksaedi 2020).

The attitude of caring for the environment can affect a person's behavior towards the environment depending on their level of knowledge (Aliman et al. 2019). This attitude towards the environment is seen as important to foster community attitudes and behavior, particularly among students. A study by Altin et al. (2014) showed a high level of environmental awareness among participant students. It is recognized, however, that environmental disclosures made in schools are insufficient, and that student participation in environmental initiatives is low. The findings of this study revealed that a high degree of environmental awareness among students did not turn into active participation and led them to pro-environmental attitudes (Altin et al. 2014).

Various environmental problems threaten environmental sustainability and many of these problems are rooted in human behavior. Abusafieh and Razem (2017) firmly believe that the built environment should be used to support human goals and requirements, but at the same time should be considered in a context where human values and behaviors are cultivated. They ventured to utilize architectural design in changing relevant human behavior towards environmentally friendly behavior, which provided a systematic approach for selecting, assessing, and evaluating the behaviors to be changed and the factors that determine them. Furthermore, their approach helps in choosing the best interventions that could be applied in the built environment to encourage such sustainable behavior (Berame et al. 2021). Palupi and Sawitri (2018) investigated variables that affect pro-environmental behaviors among university students.

Although the current generation has great access to environmental information through various media outlets and the inclusion of environmental science as a subject taught in school, it does not mean that environmental behavior is being developed. By acknowledging this existing gap, this study seeks to find out the participants' level of understanding toward the environment and their attitude toward the environment and how they behave toward the environment. This is to determine if understanding and attitude toward the environment affect human behavior toward the environment and what particular attitude has more influence toward pro-environmental behaviors than the others.

## MATERIALS AND METHODS

The study utilized a mixed-method research design, specifically the sequential explanatory strategy to assess the environmental attitude and behavior of the senior high school students of Santiago National High School towards ecological conservation and preservation. The strategy is characterized by a collection and analysis of quantitative data followed by a gathering and evaluation of qualitative data gathered through surveys and interviews which will assist in explaining and interpreting the findings of the quantitative study (Creswell 2015). In this study, the

transcribed interview data were used to refine and solidify the results of the environmental attitudes and ecological behavior data of the SHS students.

### Participants of the study

Through stratified random sampling, participants of the study were the Science, Technology, Engineering, and Mathematics (STEM) Senior High School students of Santiago National High School S.Y. 2021-2022. In determining the sample size of the participants, the researchers used the formula  $n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$  where  $n$  is the sample size,  $n_0$  is the value for an infinite population, and  $N$  is the total population of the study. In this case, a total of 147 enrolled STEM students were the target participants, with a calculated sample size of 119 participants.

This table shows the distribution of participants from the two grade levels. The minimum required sample size was calculated as 119 participants based on a reasonably expected frequency of respondents within the given population, using an  $\alpha$  value of 0.5. Sixty-two (62) participant samples were needed from Grade 11 while 57 were from Grade 12. These numbers of samples from each group were then randomly selected to represent the STEM population.

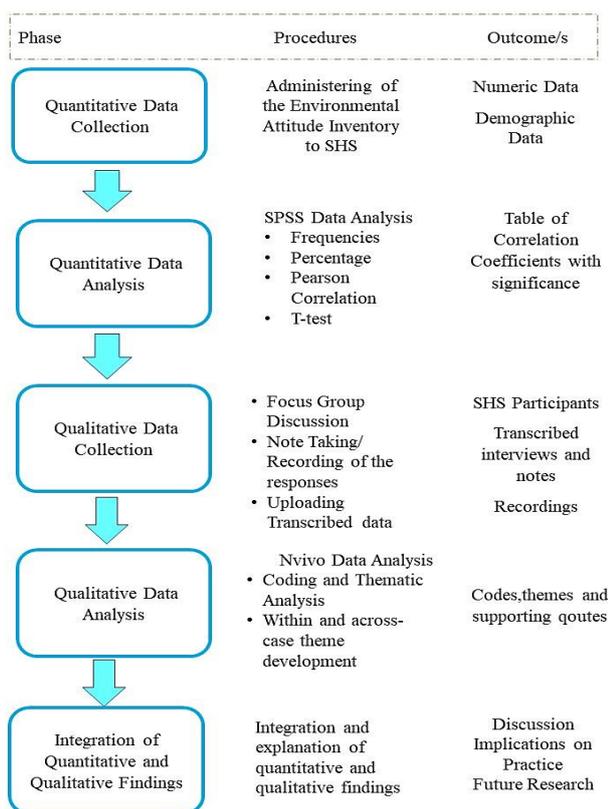
### Research instrument

The researchers used a survey questionnaire as the primary instrument in gathering the data. The questionnaire was adapted from Environmental Attitude Inventory (Milfont and Duckitt 2010). All scales were included in Environmental Attitude Inventory while researchers crafted qualitative questions validated by the experts in the field. The questionnaire was composed of three parts. The first part measured the high school students' attitude towards the environment in terms of anthropocentric attitude, eco-centric attitude, and human dominance over nature.

The second part measured the attitude towards ecological behavior, which included the attitude towards the utilization of nature, attitude towards conservation policy, confidence in science and technology, environmental threat and support for population growth policies. Finally, the last part of the questionnaire measured the environmental behavior that focuses on environmental movement activism, altering nature, and the personal conservation behavior of the participants. Qualitative data that will strengthen the SHS students' answers were recorded through questions inserted after every scale in the survey questionnaire.

**Table 1.** Distribution of participants

Stratum	Population ( $N_i$ )	Proportion ( $P_i = \frac{N_i}{N}$ )	Sample needed per stratum ( $n_i = n * P_i$ )
STEM 11	77	0.5238	62
STEM 12	70	0.47619	57
Total	147	1.0	119



**Figure 1.** Data collection flow chart

#### Sampling technique used

This study used stratified random sampling. It involves the division of a population into two or more homogenous groups called strata where samples are randomly selected from each stratum. Analysis of data was conducted from the selected participants who fit the purpose of the study.

#### Data gathering procedure

The researcher requested the School Principal before the conduct of the study through a written request recommended by the Science Investigatory Project Adviser (Figure 1). The adopted and revised questionnaire (Milfont and Duckitt 2010) was administered to the SHS-STEM students at Santiago National High School. When data were available, the researchers enforced a focus group interview with the use of open-ended survey questions to substantiate the provided data. The collected data were

summarized, tabulated, arranged using SPSS and transcribed for thematic analysis using NVivo.

#### Statistical treatment of the study

The researcher processed the quantitative data through the Statistical Package for Social Science (SPSS) such as mean, standard variation and Pearson R. The study utilized a mixed method research design, i.e., the Explanatory Sequential Strategy to elucidate qualitative and quantitative data. The mean was employed to describe the level of environmental attitude, ecological attitude and environmental behavior of the respondents. The percentage was utilized in expressing the relative frequency of survey responses and other data. Standard deviation was used to measure the variation there was within the responses of the SHS students in terms of environmental attitude, ecological and environmental behaviors. Pearson-product moment correlation was employed to assess the strength of the linear relationship between ecological behavior and environmental behavior. Further, to determine any significant difference between variables, a dependent t-test statistic was used.

## RESULTS AND DISCUSSION

#### Environmental attitude

Environmental attitudes were measured under three scales, namely: anthropocentric attitude, eco-centric attitude, and human dominance over nature. The following tables presented below provide insights into the participant's environmental attitudes.

Environmental issues are categorized as anthropogenic since one of their primary causes is how people view the natural world (Bergman, 2016). As per Nazarenko and Kolensik (2018), environmental attitudes and actions can be established if they are motivated by sentiments about the environment. With that being mentioned, it is presented in this summary table on the attitude toward environment that the participants were uncertain or undecided on their attitude towards the environment, meaning they do have an intermediate attitude on how they view the environment, basing it on the overall mean of 3.49. The participants were neither agreeing nor disagreeing with human dominance over nature and eco-centric value of nature. There was only one sub-variable along environmental attitude, the anthropocentric attitude where participants strongly agreed on the indicators under this scale (Table 2).

**Table 2.** Summary table on the attitude towards the environment

Environmental attitude scale	Standard deviation	Mean	Descriptive equivalent	Interpretation
Anthropocentric attitude	0.87	4.41	Strongly agree	Positive attitude
Eco-centric attitude	1.47	3.08	Uncertain	Intermediate attitude
Human dominance over nature	1.25	2.97	Uncertain	Intermediate attitude
Overall	1.20	3.49	Uncertain	Intermediate attitude

As defined by Abun and Racoma (2017), environmental anthropocentrism is valuing nature because of the material or physical benefits it can provide for humans. To substantiate the quantitative data presented, the participants were asked what makes nature or the environment valuable to them to gather the participants' anthropocentric attitudes. Four major codes emerged from the analysis of the current data set: Stress Reliever, God's Creation, Contribution to living things and Clean and safer home to humans. It was revealed that the majority of the respondents answered that nature is important because it serves as their home and due to its contribution to living things. One of the participants noted in his/her response that nature is important in the sense that we are living in it and our survival depends on it.

Eco-centric attitude as per Oviedo-Trespalacios et al. (2017) broadly encompasses concern for the ecosystems. Unlike anthropocentrism, ecocentrism pinpoints that life is interdependent and that both humans and nonhumans are dependent on the ecosystem processes that nature provides. The participants were asked for their reaction to the rampant undesirable activities such as deforestation and illegal mining that are slowly destroying the environment or our planet Earth in general to generate qualitative data under an eco-centric attitude. Students expressed their negative emotions about the undesirable activities that the environment was experiencing. Majority of the participants were saddened by the actions brought by those activities. Few responses captured the gist of the question, such as they feel sad knowing that the government does not do anything to suppress these undesirable activities, which will cause a negative impact on the environment and most specifically on the future generation. The participants generally saw that these undesirable actions that keep destroying the planet make them hurt, sad, and angry. Restoration of the planet from individual efforts with point cooperation also emerged from the collected set of data.

These results were similar to the study of Abun and Aguot (2017) where their study revealed that anthropocentric attitude and eco-centric attitudes were found to be dominant among students. However, the correlation was found only between eco-centric attitude and environmental behavior along with environmental movement activism and personal conservation behavior, while anthropocentric and human dominance over nature attitudes do not correlate to environmental behavior. Another study to support this is the meta-analysis of environmental knowledge, attitudes, and behaviors of young people worldwide conducted by Mifsud (2012). The research discovered that the majority of young people around the world reported having a good attitude toward the environment and varying degrees of environmental knowledge.

Meanwhile, human dominance over nature was corroborated with the participants' response about how humans can do their role as stewards of nature and integrate the concept of management of the "natural" system. One respondent noted that "They do their role as steward by conserving and preserving the environment including all living things." Some responses include references such as protecting the environment, stopping

cutting trees, self-discipline, reforestation, and not abusing it. Another response provided insight that "We should do it with ease and properly. We are dependent on nature, so, if anything, we should protect and manage well the natural system."

Denial about many aspects of climate change still occurs among some populations, which contributes to the ongoing delay in taking action on the issue. It was found in a study by Jylha et al. (2020) that only acceptance of *human dominance over nature and animals* predicted climate change denial in Hong Kong. Two justifications for the potential connection between ideas about social hierarchies and environmental beliefs have been put forth using the social dominance theory as a foundation (Hornsey 2021). According to the human-nature hierarchy enforcement hypothesis, people who hold hierarchical worldviews are at ease with the hegemonic idea that humans come first before the natural world. As a result, they reject arguments that claim to put human needs aside to safeguard the environment is necessary. Since the participants varied in social statuses, this may imply that their differences in social hierarchies reflect on the uncertain or intermediate attitude toward human dominance over nature resulting in Table 2.

### Ecological behavior

Ecological behavior is an action that contributes toward environmental conservation. This can be measured in terms of attitude towards utilization of nature, attitude toward conservation policy, confidence in science and technology, environmental threat, and support for growth policy.

Table 3 shows that the ecological behavior of senior high school students particularly on the attitude toward the utilization of nature, had an overall mean of 3.26 which is uncertain, provided information that students had a vague understanding of how nature should be properly utilized and was undecided to take a stand on whether to agree or disagree with some of the proposed attitudes toward the utilization of nature. Nevertheless, students agreed that the environment is vital to economic growth as reflected in their responses on items "Protecting the environment is important" and "To protect the environment, we need economic growth".

Economic growth and sound environmental management are not incompatible. Economic growth will be undermined without adequate environmental safeguards, and environmental protection will fail without economic growth (Environmental Encyclopedia 2022). Furthermore, students could not decide whether or not nature should be used for economic purposes, whether the welfare of modern consumers should come first over environmental problems, or whether treating the welfare of the environment as the second priority after the economy was all interpreted as undecided. This is consistent with the notion that environmental issues did not rank first in any surveyed nation (ISSP Research Group, 2012). The uncertainty gave an overall impact that the Senior High School students had a lack or limited understanding of the proper use and protection of the environment.

**Table 3.** Summary table on the ecological behavior

Ecological behavior scale	Standard deviation	Mean	Descriptive equivalent	Interpretation
Attitude towards utilization of nature	1.19	3.26	Uncertain	Intermediate attitude
Attitude towards conservation policy	1.57	3.52	Agree	Positive attitude
Confidence in science and technology	1.02	3.29	Uncertain	Intermediate attitude
Environmental threat	1.10	3.33	Uncertain	Intermediate attitude
Support for population growth policy	1.22	3.16	Uncertain	Intermediate attitude
Overall	1.22	3.31	Uncertain	Intermediate attitude

Additionally, the second scale that focused on the attitudes toward conservation policy garnered an overall mean of 3.52 with the descriptive equivalent of agreeing and interpreted as a positive attitude. This result reveals that the Senior High School students had approved of the proposed attitude towards environmental conservation such as the mindset that government should take control of the implemented policies that would protect the natural resources and use them responsibly and effectively. Accordingly, Community-based Forest programs that defer deforestation from remaining natural patches promote socioeconomic development through the planting of forest resources and livelihood development (Porter-Bolland et al. 2012).

However, students were uncertain about whether people in developed societies will adopt a more conserving life in the future. This is aligned with the idea that too much access can lead to increased development and a transition from subsistence livelihoods to more intensive market-driven tourism that leads to increased land prices, resource extraction, and further socioeconomic inequality (Dressler 2014). Further, ambiguous stand on the importance of recycling in conserving nature by limiting the use of raw materials (e.g. Industries should be able to use raw materials rather than recycled ones if this leads to lower prices and costs, even if it means the raw materials will eventually be used up; and, I am completely opposed to measures that would force the industry to use recycle materials if this would make the product more expensive). As a whole, the positive result implies that the students understood the significance of conservation policies to safeguard the environment and ensure proper utilization of nature.

For the scale that focused on confidence in science and technology, it showed that senior high school students were uncertain with the computed overall mean of 3.29, interpreted as an intermediate attitude, connoted that the Senior High School student could not decide whether to agree or disagree with the proposed attitudes on the particular scale. This also conveyed that the students did not have enough awareness of how science and technology work in protecting the environment and how innovations can solve environmental problems. Further, they could not even decide whether technology can save or harm the environment. This is supported by the statement that environmental policies often face a suspicious public, concerned on the one hand about the independence and integrity of science (Rapley et al. 2020), and on the other

about how scientific evidence is used to promote solutions to environmental problems or address “policy needs” (Bromley-Trujillo, Stoutenborough, Vedlitz, 2015).

In addition, the scale for senior high school students in environmental threat gained consistency with an overall mean of 3.33 interpreted as uncertain. This implies that students did not agree with the proposed indicators and did not have a clear scenario of the current condition of the environment and how human activities severely affect nature which causes environmental degradation. It is also evident that students disagreed with items like the environment is not severely abused by humans and agreed with the idea that when humans interfere with nature this will often lead to disastrous events. Based on the Philippine Development Plan, Chapter 10 titled Conservation, Protection-and, Rehabilitation of the Environment and Natural Resources, the country is widely acknowledged as having an outstanding endowment of natural resources, which could provide essential ecosystem services to the population. Demands arising from development and utilization activities, population expansion, poor environmental protection, and external factors such as climate change, however, have placed the country’s environment and natural resources under grave threat (NEDA, 2016).

In terms of support for population growth policy, students consistently responded as uncertain with an overall mean of 3.16, interpreted as an intermediate attitude. Such findings concluded that students were neither agreeing nor disagreeing with the proposed attitude toward ecological behavior. Such an indecisive attitude shows that students may lack information and understanding of the impact of a rapidly expanding population on the environment and the possible consequences if no actions are enforced to control it. Students agreed on the items such as the importance of having two children or fewer and that couples should have as many children as they wish as long as they can support them. It means they agreed that bearing children should have limitations. As mentioned in the article “The Right to Have a Child: Are There Ethical Limitations?”, rights must be limited for the sake of others, especially when our own actions would endanger the lives of others. Are there ethical limits to our good? There are limits to all our good desires, precisely because these desires are given by God to be coordinated with one another according to His specific design for human beings (Everard and McInnes, 2013). However, their uncertainty is much more prevalent like in the items of having zero

population growth, dramatic reduction of the number of people on Earth, and the government's right to require married couples to have a particular number of children.

Overall evaluation of attitude toward ecological behavior of Senior High School students in utilization of nature, conservation policies, confidence in Science and Technology, environmental threat, and population growth policies were at 3.31 which is uncertain or undecided. Four (4) out of the five (5) scales have a verbal interpretation of uncertain (intermediate attitude) and only 1 scale is interpreted as agree (positive attitude). This is a representation that SHS students had no clear viewpoint or position related to their attitude toward ecological behavior in terms of the aforementioned scales. It was only through conservation policies that students agreed to the proposed attitude. However, as a whole, the students were indecisive about their attitude toward the ecological behavior proposed in this study. Reasons could be due to a lack of information about the environment and the environmental issues within their community.

### Environmental behavior

Environmental behavior involves both positive and negative actions that may uplift or deteriorate the environment. Therefore, in a limited sense, environmental behavior refers to any conduct that significantly affects the environment. All actions aimed at preventing harm to and/or protecting the environment are considered pro-environmental behavior (Steg and Vlek 2009), either performed in public (e.g., participation in environmental activism) or private domains (e.g., recycling; Hadler and Haller 2011). This can be measured in terms of behavior toward the enjoyment of nature, environmental activism, altering nature and personal conservation.

Table 4 displays the overall level of EB of SHS students. In regard to how they feel about being in nature, the mean yielded 3.25 falling under the uncertain category. This connoted that students had moderate or intermediate behavior as to how they enjoy nature. The respondents were uncertain if they love spending time in wild, untamed wilderness areas or would rather spend their weekends in the city shopping than engaging in nature. This analysis is supported with the work of Rosa and Collado (2019) wherein their paper revealed that there is a positive relationship between people's environmental attitudes (EA) and behaviors and their direct experiences in nature. Moreover, studies revealed that there is a significant decrease in people's direct contact with nature (Soga et al. 2018; Soga and Gaston 2016). Several causes have been suggested for this rising alienation from nature, including

increased urbanization rates, increased use of modern technology for entertainment, changing nature of children and parenting and the view of neighboring natural regions as unsafe (Tandon et al. 2012; Soga et al. 2018; Deville et al. 2021) which resulted in more time spent indoors, producing a physical and emotional disconnection from nature and time spent in natural areas. The lack of experiences in nature may have negative consequences for people's pro-environmentalism (i.e., their pro-EA and pro-EB) (Soga and Gaston 2016; Crowe, 2013; Rosa et al. 2018), which could lead to detrimental consequences for the environment (Evans 2019). Disconnection from nature not only reduces a wide range of health and well-being benefits, but also discourages positive feelings, attitudes, and behaviors with regard to the environment (Nisbet and Zelenski 2014).

Nevertheless, when respondents were asked why people spend their family bonding in nature, a positive perception emerged. Nature was perceived as a therapeutic place that offers a relaxing avenue that deepens family bonds with fun activities it can offer. These responses could be attributed to the fact that the environment is beneficial mentally, socially, emotionally, psychologically, and physiologically (Puhakka 2021; Zamora et al. 2021). Although the respondents EB towards enjoying nature is moderate with a total mean score of 3.25, it is a jumpstart for the cultivation of positive attributes toward enjoying being in nature, as Zamora et al. (2021) found that it is linked to better health in young people. Also, the second scale measuring the respondents' behavior through environmental movement activism (EMA) garnered a total mean score of 3.19, interpreted as an intermediate behavior.

This result underscored the student's willingness to finance environmental activities, engage actively in environmental movements, persuade others of the environment's importance, and support environmental organizations.

This positive behavior towards environmental activism of the youth has gained worldwide notoriety (Fung and Adams 2017; Hartley et al. 2021; Mackay et al. 2021; Walker 2017). Emerging research suggests youth activism can promote behavior and policy change in some contexts including climate change (Haynes and Tanner 2015). Furthermore, respondents manifested to help spread environmental awareness which is believed to have a substantial impact on people's daily routines and consumer behavior (Walker 2017; Williams et al. 2017; Zsóka et al. 2013).

**Table 4.** Summary table on the environmental behavior

Environmental behavior scales	SD	Mean	Descriptive equivalent	Interpretation
Enjoyment over nature	1.26	3.25	Uncertain	Intermediate
Environmental activism	1.32	3.19	Uncertain	Intermediate
Altering nature	1.04	3.25	Uncertain	Intermediate
Personal conservation	1.29	3.23	Uncertain	Intermediate
Grand mean	1.23	3.23	Uncertain	Intermediate

Some participants described a specific need to create an organization that will focus on the environmental health program. These participants articulated that it is a must to have an organization that will support environmental activities to preserve the environment and mitigates environmental issues such as global warming, air pollution and waste management. Such student's positive drive corroborated with the study of Yurttu and Sullun (2010), showing that groups assist students in making connections with others who share their interests. This connection makes it easier for students to express and realize their ideas as they relate to their various youth group activities. While several studies have shown that education is a key factor in increasing environmental awareness (Freymer and Johnson 2010; Duroy 2005; Kolmuss and Agyeman 2002), students should have sufficient knowledge of environmental issues and a good perception of one's impact on the environment. Deiarne and Hagos (2008) reported that integration of environmental education is necessary to produce students who are earth-friendly, committed to environmentally sound lifestyles and prepared to contribute to the environment.

Along with this, interview responses entailed the students 'aggressiveness in taking steps to inspire actions among others which may begin within their families or close friends. However, responses were least clustered on setting good which can be attributed that while knowing what to do, manifesting it is challenging to do. This analysis is substantiated by Handoyo et al. (2021) extrapolating a mismatch between students' awareness of environmental problems and their actions toward environmentally responsible behavior. In addition, Erhabora and Don (2016) results revealed a prominent level of environmental knowledge and positive attitude towards the environment among the students, whereas the relationship between their knowledge and attitude towards the environment is negative, with little or no relationship. From the literature, it can be deduced that being environmentally aware does not necessarily translate directly into environmentally responsible behavior, hence, it is urged to develop dynamic environmental education strategies to address this lacuna (Piyapong 2019). As a whole, the intermediate behavior of the SHS student implies that the students lack interest in engaging in environmental activism.

For the scale that measured altering nature, the analysis revealed that senior high schools were uncertain with the computed overall mean of 3.25, interpreted as an intermediate behavior. This connote passivity, whether to alter nature or leave nature as it is. This also conveyed that the students care less about environmental activities that may either promote or destroy nature's physical estate. These data implied that the environmental behavior of the respondents at an average level was only satisfactory which signified the same deficiencies/gap. This analysis can be construed that the students having varied standpoints as to how they will utilize nature. This finding affirms the work of Ibáñez -Rueda et al. (2020) who deduced from their study that pro-environmental behaviors differ between individuals and groups.

The analysis of participants' personal conservation behavior toward the environment conceded an overall mean of 3.23 interpreted as an intermediate behavior. Despite an intermediate result of the analysis, it is noteworthy to mention that participants manifest conservation through conserving water supply, power and natural resources. These positive behaviors towards personal conservation indicate that respondents developed the right beliefs and even the perspectives favorable to the conservation and development of the environment. On the other hand, there were conservation behaviors the respondents could not relate to such as driving a car as a means of transportation which respondents responded with uncertainty. This was seen to be the negating indicator that dragged down the participant's behavior to an intermediate behavior. This analysis supported Lee's (2008) findings, according to which some of the attitude scale's items were ambiguous to the participants.

Overall evaluation of behavior toward the environment of Senior High School students in terms of enjoyment over nature, environmental activism, altering nature and personal conservation was at 3.23 denoting an intermediate level of behavior. This outlined the student's passiveness on the given scales of pro-environmental behaviors. Moreover, in totality, the students were indecisive in their attitude toward pro-environmental behavior investigated in this study. This could be attributed to a lesser conviction of the environmental impacts when poor and damaging environmental behavior is exhibited and the inability to execute the ideal behavior that they are aware of. This analysis parallels the work of Shutaleva et al. (2022) where they revealed that young people know environmental practices, but often do not apply them systematically. The advent of technology, mass media and social networks may be a key influencer in the formation of positive environmental behavior practices for a more sustainable world to live in.

### Environmental attitudes and ecological behavior significant relationship

Investigating the relationship significance between environmental attitude and behavior of SHS students was the main theme of this research undertaking. Several studies investigating the correlation of the two variables in varying participants yielded a positive correlation (Hadler and Haller 2011; Hidayah and Agustin 2017; Li et al. 2019; Shutaleva et al. 2022). Anchored to this, Table 5 shows the result of the t-test analysis between the environmental attitude and ecological behavior of the SHS students.

**Table 5.** Test of a significant relationship between environmental attitudes and ecological behavior of senior high school students

		<b>Environmental attitudes</b>
Ecological behavior	Pearson correlation	.588**
	Sig. (2-tailed)	.000

The obtained r-value was 0.588 justifying that the alternative hypothesis was accepted. This result indicated that there was a significant relationship between the environmental attitude and ecological behavior of the students towards the environment. Although the obtained value was low because of the obtained mean ratings, environmental attitudes such that anthropocentric and human dominance over nature significantly influences the ecological behavior of the respondents toward conservation policies, environmental threats and support for population growth policies.

Seemingly, the type of environmental attitude of the respondents may influence their behavior on how they respond to conservation policies, environmental threats and population growth policies. The human dominance over nature attitude prominently correlated ecological behavior toward conservation policies, environmental threat and population growth policies with significance levels of 0.70, 0.16 and 0.11, respectively. On the other hand, only the anthropocentric attitude was found to be significantly related to the ecological behavior towards supporting population growth policies with a high significance level of .436. Anthropocentric attitudes were believed to be a significant driver of ecocide exacerbating environmental issues (Washington 2013).

As the data revealed, the anthropocentric attitude was correlated to support for growth population policies entailing over-population with regards to how resources are managed. If individuals view nature as a tool to satisfy human needs, this may result in the exploitation of natural resources, causing dreadful environmental crises. This analysis is solidified by Oviedo-Trespacios et al. (2017) positing that anthropocentrism cannot lead us to a sustainable future. Ecocentrism, in contrast, accepts that we are part of nature, and have a responsibility to respect the web of life and heal the damage caused by the ideological dominance of anthropocentrism. Apparently, an eco-centric attitude was found to have no significant relationship with any ecological behavior in contrast to the findings of Aguot (2018). Thus, it is dreaded that this may have an impact on the community the respondents belong to, as Byerly et al. (2018) indicated that many of our greatest environmental challenges are the result of human behavior. Protecting natural resources requires changing human behavior (Clayton et al. 2013) Social influence and minor changes to decision-making settings have been shown to influence pro-environmental decisions (Byerly et al. 2018). Li et al. (2019) outlined that external and internal factors may influence pro-environmental behavior, thus, identifying pro-environmental behavior determinants is substantial when designing the most appropriate and effective policies for improving the public's behavior toward protecting the natural environment.

### SHS perception of environmental conservation

Extant pressing environmental concerns are ubiquitous globally, thus, addressing concerns should be responded to at the local level to mitigate a global environmental crisis. The qualitative analysis of the student's responses on how

they perceive the importance of environmental conservation and its impact on the extant alarming environmental issues in their community were investigated. Their responses are tallied in Table 6. Most students expressed a higher degree of environmental conservation importance by expressing the actions they would do to combat issues in their community.

Table 6 conveys the student's positive drive to help their locality by: conserving power, water and natural resources (24%); engaging in environmental activities such as tree planting and proper waste segregation (18%); helping the community to maintain safety and cleanliness of the area (17%); spreading awareness to the family members of how important conservation is (14%); protecting wildlife and promoting biodiversity (11%), executing eco-friendly lifestyle such as reduction of plastic usage to decrease pollution (14%); and setting a good example by adapting positive conservation behavior. These responses strongly indicated that students recognized the importance of their community. Furthermore, this also conveyed the enthusiasm of the students to participate in mitigating the pressing environmental problems by starting in their localized area. In addition, they recognized from their responses the importance of conservation for the future of upcoming generations. The compounding issues such as illegal mining, waste management, water pollution and destruction of forests were also noted in their responses.

These findings highlight that the students consider environmental conservation practices to help combat environmental issues and protect the proliferation of mankind. Moreover, their responses hinted at a positive manifestation of their perspective on pressing environmental catastrophes as some of them opt to set a good example to others to create a positive impact environmentally. According to Morar and Peterlicean (2012) conservation of nature is highly important for the good development of social and economic life. Thus, pressing the concern of actively nurturing these positive conservation behaviors of the respondents for a better community and nation. Barret (2021) concluded that focusing on local issues, partnerships, and action is key to achieving cognitive and affective conservation behavior outcomes.

**Table 6.** SHS responses on how they mitigate environmental issues locally

Actions towards environmental conservation issues	Freq.	Percent.
Maintain safety and cleanliness	23	17 %
Protect wildlife and promote biodiversity	15	11 %
Conserve power, water and natural resources	33	24%
Spread awareness	19	14%
Set good example	8	6%
Engage in positive environmental activities	25	18%
Practice eco-friendly lifestyle	14	10%
Grand Frequency / Percentage	137	100%

The measured r-value supports the alternate hypothesis of this study by showing a substantial link between environmental attitude and behavior. Environmental attitudes such as anthropocentrism and human dominance over nature significantly influences the ecological behavior of the respondents toward conservation policies, environmental threats, and support for population growth policies, even though the obtained value was low due to the obtained mean ratings. Thus, the researchers concluded that the senior high school students had already formed an awareness of the true importance of nature but lacked interest in taking action to engage themselves in nature conservation activities.

### Conflict of interest

The authors declare that they have no known competing financial interests that could have appeared to influence the work reported in this paper.

## REFERENCES

- Abun D, Racoma A. 2017. Environmental attitude and environmental behavior of catholic colleges' employees in Ilocos Sur, Philippines. *Human Soc Sci* 4 (1): 23-52. DOI: 10.21522/tjar.2014.04.01. art003.
- Abusafieh S, Razem M. 2017. Human behavior and environmental sustainability: promoting a pro-environmental behavior by harnessing the social, psychological and physical influences of the built environment. *E3S Web Conf* 23. DOI: 10.1051/e3sconf/20172302003.
- Aguot F. 2018. Measuring environmental attitude and environmental behavior of senior high school students of Divine Word Colleges in Region I, Philippines. <https://hal.archives-ouvertes.fr/hal-02330421>
- Aliman M, Budijanto S, Astina IK. 2019. Improving environmental awareness of high school students' in Malang City through Earthcom Learning in the Geography Class. *Intl J Instruction* 12 (4): 79-94. DOI: 10.29333/iji.2019.1246a.
- Altin A, Tecer S, Tecer L, Altin S, Kahraman BF. 2014. Environmental awareness level of secondary school students: A case study in Balıkesir (Türkiye). *Procedia Soc Behav Sci* 141: 1208- 1214. DOI: 10.1016/j.sbspro.2014.05.207.
- Ardoin NM, Bowers AW, Gaillard E. 2020. Environmental education outcomes for conservation: A systematic review. *Biol Conserv* 241: 108224. DOI: 10.1016/j.biocon.2019.108224.
- Barrett E. 2021. Attitudes toward the environment and use of information and communication technologies to address environmental health risks in marginalized communities: Prospective cohort study. *J Med Internet Res* 23: 9. DOI: 10.2196/24671.
- Berame J, Hojilla M, Trinidad E, Lawsın N, Orozco J, Arevalo I, Alam Z. 2021. Strategies and approaches towards environmental biomonitoring of fresh water ecosystems in the Philippines. *Nat Environ Pollut Technol* 20 (4): 1545-1553. DOI: 10.46488/NEPT.2021.v20i04.016.
- Bergman BG. 2016. Assessing impacts of locally designed environmental education projects on students' environmental attitudes, awareness, and intention to act. *Environ Educat Res* 22 (4): 480-503. DOI: 10.1080/13504622.2014.999225.
- Bromley-Trujillo R, Stoutenborough JW, Vedlitz A. 2015. Scientific advocacy, environmental interest groups, and climate change: Are climate skeptic portrayals of climate scientists as biased accurate? *Clim Change* 133: 607-619. DOI: 10.1007/s10584-015-1477-0.
- Byerly H, Balmford A, Ferraro PJ, Hammond C, Palchak E, Polasky S, Ricketts TH, Schwartz AJ, Fisher B. 2018. Nudging pro-environmental behavior: evidence and opportunities. *Front Ecol Environ* 16 (3): 159-168. DOI: 10.1002/fee.1777.
- Clayton S, Litchfield C, Geller ES. 2013. Psychological science, conservation, and environmental sustainability. *Front Ecol Environ* 11 (7): 377-382. DOI: DOI: 10.1890/120351.
- Crowe, J. L. 2013. Transforming environmental attitudes and behaviours through eco-spirituality and religion. *Intl Electr J Environ Educat* 3 (1): 75-88. DOI: 10.1088/1755-1315/156/1/012035/meta.
- Deiarne G, Hagos B. 2008. The need to integrate themes of environmental education in the school curriculum in Kenya. *Intl J Acad Res Progr Educat Dev* 2 (1): 51-57.
- Deville NV, Tomasso LP, Stoddard O P, Wilt GE, Horton TH, Wolf KL, Brymer E, Kahn PH, James P. 2021. Time spent in nature is associated with increased pro-environmental attitudes and behaviors. *Intl J Environ Res Publ Health* 18 (14). DOI: 10.3390/ijerph18147498.
- Dressler W. 2014. Green governmentality and swidden decline on Palawan Island. *R Geogr Soc* 39 (2): 250-264. DOI: 10.1111/tran.12026.
- Duroy QM. 2005. The determinants of environmental awareness and behaviour. *Rensselaer Working Papers in Economics*. Rensselaer Polytechnic Institute, Department of Economics. DOI: 10.22004/ag.econ.113244.
- Erhabora N. 2016. Impact of environmental education on the knowledge and attitude of students towards the environment. *Intl J Environ Sci Edu* 11 (12): 5367-5375.
- Evans G, Ottoa S, Moonc M, Kaiser F. 2018. The development of children's environmental attitude and behavior. *Global Environ Change* 58. DOI: 10.1016/j.gloenvcha.2019.101947.
- Everard M, McInnes R. 2013. Systemic solutions for multi-benefit water and environmental management. *Sci Tot Environ* 461, 170-179. DOI: 10.1016/j.scitotenv.2013.05.010.
- Freyemeyer R, Johnson B. 2010. A cross-cultural investigation of factors influencing environmental actions. *Soc Spectrum* 30 (2): 184-195. <https://doi.org/10.1080/02732170903496075>.
- Fung CY, Adams EA. 2017. What motivates student environmental activists on college campuses? An in-depth qualitative study. *Soc Sci* 6 (4). DOI: 10.3390/socsci6040134.
- Hadler M, Haller M. 2011. Global activism and nationally driven recycling: The influence of world society and national contexts on public and private environmental behavior. *Sage J* 26, 3. DOI: 10.1177/0268580910392258.
- Handoyo B, Astina IK, Mkumbachi RL. 2021. Students' environmental awareness and pro-environmental behaviour: preliminary study of geography students at State University of Malang. *IOP Conf Ser: Earth Environ Sci* 683 (1): 12049. DOI: 10.1088/1755-1315/683/1/012049.
- Hartley JM, Stevenson KT, Peterson MN, DeMattia EA, Paliotti S, Fairbairn TJ. 2021. Youth can promote marine debris concern and policy support among local voters and political officials. *Front Polit Sci* 3. DOI: 10.3389/fpos.2021.662886.
- Haynes K, Tanner TM. 2015. Empowering young people and strengthening resilience: youth-centred participatory video as a tool for climate change adaptation and disaster risk reduction. *Children's Geograph* 13 (3): 357-371. DOI: 10.1080/14733285.2013.848599.
- Hidayah N, Agustin R. 2017. Assessing high school students' pro-environmental behavior. *J Phys: Conf Ser* 895 (1). DOI: 10.1088/1742-6596/895/1/012002/pdf.
- Hornsey M. 2021. The role of worldviews in shaping how people appraise climate change. *Curr Opin Behav Sci* 42: 36-41. DOI: 10.1016/j.cobeha.2021.02.021.
- Ibáñez-Rued N, Guillén-Royo M, Guardiola J. 2020. Pro-environmental behavior, connectedness to nature, and wellbeing dimensions among granada students. *Sustainability* 12 (21): 1-16. DOI: 10.3390/su12219171.
- Jylha K, Tam K, Milfont T. 2020. Acceptance of group-based dominance and climate change denial: A cross-cultural study in Hong Kong, New Zealand, and Sweden. *Asian J Soc Psychol* 24 (2): 198-207 DOI: 10.1111/ajsp.12444.
- Kollmuss A, Agyeman J. 2002. Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environ Educat Res* 8 (3): 239-260. DOI: 10.1080/13504620220145401.
- Lee B. 2008. Environmental attitudes and information sources among African American College Students. *J Environ Educat* 40, 1. DOI: 10.3200/JOEE.40.1.29-42.
- Li D, Zhao L, Ma S, Shao S, Zhang L. 2019. What influences an individual's pro-environmental behavior? A literature reviews. *Resour Conserv Recycl* 146, 28-34. DOI: 10.1016/J.RESCONREC.2019.03.024.

- Li Y. 2019. Study of the effect of environmental education on environmental awareness and environmental attitude based on environmental protection law of the People's Republic of China. *Eurasia J Math Sci Technol* 14 (6): 2277-2285. DOI: 10.29333/ejmste/105639.
- Mackay CM, Cristoffanini F, Wright JD, Neufeld SD, Ogawa HF, Schmitt MT. 2021. Connection to nature and environmental activism: Politicized environmental identity mediates a relationship between identification with nature and observed environmental activist behaviour. *Curr Res Ecol Soci Psychol* 2, 100009. DOI: 10.1016/j.cresp.2021.100009.
- Maravić M, Cvjetičanin S, Ivkovic S. 2014. Level of environmental awareness of students in Republic of Serbia. *World J Educ* 4 (3): 2014. DOI: 10.5430/wje.v4n3p13.
- Milfont TL, Duckitt J. 2010. The environmental attitudes inventory: A valid and reliable measure to assess the structure of environmental attitudes. *J Environ Psychol* 30 (1): 80-94. DOI: 10.1016/j.jenvp.2009.09.001.
- Mifsud M. 2012. A meta-analysis of global youth environmental knowledge, attitude and behavior studies. *Centre Environ Educ Res* 8, (4): 89-1006. <https://www.um.edu.mt/library/oar/handle/123456789/56351>
- Morar F, Peterlicean A. 2012. The role and importance of educating youth regarding biodiversity conservation in protected natural areas. *Proc Econ Finance* 3, 1117-1121. DOI: 10.1016/S2212-5671(12)00283-3.
- Nazarenko AV, Kolesnik AI. 2018. Raising environmental awareness of future teachers. *Intl J Inst* 11 (3): 63-76. DOI: 10.12973/iji.2018.1135a.
- Nisbet EK, Zelenski JM. 2014. Nature relatedness and subjective well-being. In: Michalos AC (ed). *Encyclopedia of Quality of Life and Well-Being Research*. Springer Netherlands. DOI: 10.1007/978-94-007-0753-5\_3909.
- Oviedo-Trespalacios O, Haque MM, King M, Washington S. 2017. Self-regulation of driving speed among distracted drivers: An application of driver behavioral adaptation theory. *Traffic Inj Prev* 18 (6): 599-605. DOI: 10.1080/15389588.2017.1278628.
- Palupi T, Sawitri DR. 2018. The importance of pro-environmental behavior in adolescent. *E3S Web Conf* 31. DOI: 10.1051/e3sconf/20183109031.
- Piyapong J. 2019. Factors affecting environmental activism, nonactivist behaviors, and the private sphere green behaviors of Thai University Students. *Educ Urban Soc* 52 (4): 619-648. DOI: 10.1177/0013124519877149.
- Porter-Bolland L, Villaseñor E, Escobar-Sarria L, Matthias Rös, Albert M. Dzul C, López S, López Díaz A. 2012. Selection of indicators as a tool for negotiating objectives and evaluating targets within participatory monitoring. *Sustain Sci* 15: 1051-1065. DOI: 10.1007/s11625-020-00795-w.
- Puhakka R. 2021. University students' participation in outdoor recreation and the perceived well-being effects of nature. *J Outdoor Recreat Tour* 36: 100425. DOI: 10.1016/J.JORT.2021.100425.
- Rapley T, Brushwooda J, Hall C. 2020. Unintended costs of a dual regulatory environment: Evidence from state-level cannabis legalization and bank audit fees. *J Accounting Publ Policy* 39 (3), 106736. DOI: 10.1016/j.jaccpubpol.2020.106736.
- Rosa C, Collado S. 2019. Experiences in nature and environmental attitudes and behaviors: Setting the ground for future research. *Front Psychol* 10. DOI: 10.3389/fpsyg.2019.00763.
- Shafiei A, Maleksaeidi H. 2020. Pro-environmental behavior of university students: Application of protection motivation theory. *Glob Ecol Conserv*. DOI: 10.1016/j.gecco.2020.e00908.
- Shutaleva A, Martyushev N, Nikonova Z, Savchenko I, Abramova S, Lubimova V, Novgorodtseva A. 2022. Environmental behavior of youth and sustainable development. *Sustainability (Switzerland)* 14 (1). DOI: 10.3390/su14010250.
- Soga M, Gaston KJ. 2016. Extinction of experience: the loss of human-nature interactions. *Front Ecol Environ* 14 (2): 94-101. DOI: 10.1002/fee.1225.
- Soga M, Yamanoi T, Tsuchiya K, Koyanagi TF, Kanai T. 2018. What are the drivers of and barriers to children's direct experiences of nature? *Landsc Urban Plann* 180: 114-120. DOI: 10.1016/J.LANDURBPLAN.2018.08.015.
- Steg S, Vlek C. 2009. Encouraging pro-environmental behaviour: An integrative review and research agenda. *J Environ Psychol* 29 (3): 309-317. DOI: 10.1016/j.jenvp.2008.10.004.
- Tandon PS, Zhou C, Christakis DA. 2012. Frequency of parent-supervised outdoor play of US preschool-aged children. *Arch Pediatr Adolesc Med* 166 (8): 707-712. DOI: 10.1001/archpediatrics.2011.1835.
- USAID. 2022. Agency for International Development. Philippine Environment. <https://www.usaid.gov/philippines/energy-and-environment>.
- Walker C. 2017. Tomorrow's leaders and today's agents of change? Children, sustainability education and environmental governance. *Childr Soc* 31 (1): 72-83. DOI: 10.1111/chso.12192.
- Williams S, McEwen LJ, Quinn N. 2017. As the climate changes: Intergenerational action-based learning in relation to flood education. *J Environ Educ* 48 (3): 154-171. DOI: 10.1080/00958964.2016.1256261.
- Yurta A, Sullun B. 2010. Environmental awareness among secondary school. 5 (5). DOI: 10.5281/zenodo.574858.
- Zamora AN, Waselewski ME, Frank AJ, Nawrocki JR, Hanson AR, Chang T. 2021. Exploring the beliefs and perceptions of spending time in nature among U.S. youth. *BMC Pub Health* 21 (1): 1586. DOI: 10.1186/s12889-021-11622-x.
- Zsóka Á, Szerényi ZM, Széchy A, Kocsis T. 2013. Greening due to environmental education? Environmental knowledge, attitudes, consumer behavior and everyday pro-environmental activities of Hungarian high school and university students. *J Clean Prod* 48: 126-138. DOI: 10.1016/j.jclepro.2012.11.030.